

SEQUENCE LISTING

<110> Knutzon, Debbie

<120> POLYUNSATURATED FATTY ACIDS IN PLANTS

<130> MOCO.156.00US

<140> 09/330,235

<141> 1999-06-10

<150> 60/089,043

<151> 1998-06-12

<160> 22

<170> PatentIn version 3.0

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Pro Arg Ile Gln Leu Pro Thr Val Asp Ala Phe Arg Arg Ala Ile Pro			
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Gln Asp Phe Ala Ala Leu Thr Ile Leu Tyr Phe Ala Leu Pro Ala Phe			
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Glu Tyr Phe Gly Leu Phe Gly Tyr Leu Val Trp Asn Ile Phe Met Gly			
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Ser Asn Trp Phe Trp Tyr Tyr Trp Val Pro Leu Ser Phe Phe Gly Leu			
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Val Tyr Glu Ala Asp Glu Trp Ser Phe Val Arg Gly Gln Thr Gln Thr			
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Thr Asp Gly His Val Ala His His Phe Phe Asn Lys Ile Pro His Tyr			
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Ser Asp Thr Gln Tyr Gly Tyr Lys Ser Gln Val Asn Tyr Asp Phe Phe			
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Ala Arg Phe Leu Trp Phe Asn Tyr Lys Leu Asp Tyr Leu Val His Lys			
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Ile	Gly	Asp	Ile	Arg	Ala	Ala	Ile	Pro	Lys	His	Cys	Trp	Val	Lys	Ser
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Ala	Leu	Ala	Met	Ala	Ala	Val	Tyr	Phe	Asp	Ser	Trp	Phe	Leu	Trp	Pro
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Leu	Tyr	Trp	Val	Ala	Gln	Gly	Thr	Leu	Phe	Trp	Ala	Ile	Phe	Val	Leu
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Gly	His	Asp	Cys	Gly	His	Gly	Ser	Phe	Ser	Asp	Ile	Pro	Leu	Leu	Asn
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Ser	Val	Val	Gly	His	Ile	Leu	His	Ser	Phe	Ile	Leu	Val	Pro	Tyr	His
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Gly	Trp	Arg	Ile	Ser	His	Arg	Thr	His	His	Gln	Asn	His	Gly	His	Val
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Glu	Asn	Asp	Glu	Ser	Trp	Val	Pro	Leu	Pro	Glu	Lys	Leu	Tyr	Lys	Asn
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Ser His Phe Asn Pro Tyr Ser Ser Leu Phe Ala Pro Ser Glu Arg Lys		
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Leu Ile Ala Thr Ser Thr Thr Cys Trp Ser Ile Met Leu Ala Thr Leu		
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Val Tyr Leu Ser Phe Leu Val Asp Pro Val Thr Val Leu Lys Val Tyr		
225	230	235
Gly Val Pro Tyr Ile Ile Phe Val Met Trp Leu Asp Ala Val Thr Tyr		
245	250	255
Leu His His His Gly His Asp Glu Lys Leu Pro Trp Tyr Arg Gly Lys		
260	265	270
Glu Trp Ser Tyr Leu Arg Gly Leu Thr Thr Ile Asp Arg Asp Tyr		
275	280	285
Gly Ile Phe Asn Asn Ile His His Asp Ile Gly Thr His Val Ile His		
290	295	300
His Leu Phe Pro Gln Ile Pro His Tyr His Leu Val Asp Ala Thr Arg		
305	310	315
Ala Ala Lys His Val Leu Gly Arg Tyr Tyr Arg Glu Pro Lys Thr Ser		
325	330	335
Gly Ala Ile Pro Ile His Leu Val Glu Ser Leu Val Ala Ser Ile Lys		
340	345	350
Lys Asp His Tyr Val Ser Asp Thr Gly Asp Ile Val Phe Tyr Glu Thr		
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<213> Mortierella alpina

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35 40 45

Leu Leu Gly Ala Gly Arg Asp Val Thr Pro Val Phe Glu Met Tyr His  
50 55 60

Ala Phe Gly Ala Ala Asp Ala Ile Met Lys Lys Tyr Tyr Val Gly Thr  
65 70 75 80

Leu Val Ser Asn Glu Leu Pro Ile Phe Pro Glu Pro Thr Val Phe His  
85 90 95

Lys Thr Ile Lys Thr Arg Val Glu Gly Tyr Phe Thr Asp Arg Asn Ile  
100 105 110

Asp Pro Lys Asn Arg Pro Glu Ile Trp Gly Arg Tyr Ala Leu Ile Phe  
115 120 125

Gly Ser Leu Ile Ala Ser Tyr Tyr Ala Gln Leu Phe Val Pro Phe Val  
130 135 140

Val Glu Arg Thr Trp Leu Gln Val Val Phe Ala Ile Ile Met Gly Phe  
145 150 155 160

Ala Cys Ala Gln Val Gly Leu Asn Pro Leu His Asp Ala Ser His Phe  
165 170 175

Ser Val Thr His Asn Pro Thr Val Trp Lys Ile Leu Gly Ala Thr His  
180 185 190

Asp Phe Phe Asn Gly Ala Ser Tyr Leu Val Trp Met Tyr Gln His Met  
195 200 205

Leu Gly His His Pro Tyr Thr Asn Ile Ala Gly Ala Asp Pro Asp Val  
210 215 220

Ser Thr Ser Glu Pro Asp Val Arg Arg Ile Lys Pro Asn Gln Lys Trp  
225 230 235 240

Phe Val Asn His Ile Asn Gln His Met Phe Val Pro Phe Leu Tyr Gly  
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Leu Leu Ala Phe Lys Val Arg Ile Gln Asp Ile Asn Ile Leu Tyr Phe  
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 Val Lys Thr Asn Asp Ala Ile Arg Val Asn Pro Ile Ser Thr Trp His  
 275 280 285  
 Thr Val Met Phe Trp Gly Gly Lys Ala Phe Phe Val Trp Tyr Arg Leu  
 290 295 300  
 Ile Val Pro Leu Gln Tyr Leu Pro Leu Gly Lys Val Leu Leu Phe  
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 Thr Val Ala Asp Met Val Ser Ser Tyr Trp Leu Ala Leu Thr Phe Gln  
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 Gly Ile Ile Gln Lys Asp Trp Ala Ala Met Gln Val Glu Thr Thr Gln  
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 Asp Tyr Ala His Asp Ser His Leu Trp Thr Ser Ile Thr Gly Ser Leu  
 370 375 380  
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 385 390 395 400  
 Tyr Pro Asp Ile Leu Ala Ile Ile Lys Asn Thr Cys Ser Glu Tyr Lys  
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<213> Mortierella alpina

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 <213> Mortierella alpina

<400> 18

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 35 40 45

Asp His Pro Gly Gly Ser Val Ile Leu Thr His Val Gly Lys Asp Gly  
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Thr Asp Val Phe Asp Thr Phe His Pro Glu Ala Ala Trp Glu Thr Leu  
 65 70 75 80

Ala Asn Phe Tyr Val Gly Asp Ile Asp Glu Ser Asp Arg Asp Ile Lys  
 85 90 95

Asn Asp Asp Phe Ala Ala Glu Val Arg Lys Leu Arg Thr Leu Phe Gln  
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Ser Leu Gly Tyr Tyr Asp Ser Ser Lys Ala Tyr Tyr Ala Phe Lys Val  
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Ser Phe Asn Leu Cys Ile Trp Gly Leu Ser Thr Val Ile Val Ala Lys  
 130 135 140

Trp Gly Gln Thr Ser Thr Leu Ala Asn Val Leu Ser Ala Ala Leu Leu  
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Gly Leu Phe Trp Gln Gln Cys Gly Trp Leu Ala His Asp Phe Leu His

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His Gln Val Phe Gln Asp Arg Phe Trp Gly Asp Leu Phe Gly Ala Phe		
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Leu Gly Gly Val Cys Gln Gly Phe Ser Ser Ser Trp Trp Lys Asp Lys		
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His Asn Thr His His Ala Ala Pro Asn Val His Gly Glu Asp Pro Asp		
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Ile Asp Thr His Pro Leu Leu Thr Trp Ser Glu His Ala Leu Glu Met		
225	230	235
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Phe Ser Asp Val Pro Asp Glu Glu Leu Thr Arg Met Trp Ser Arg Phe		
245	250	255
Met Val Leu Asn Gln Thr Trp Phe Tyr Phe Pro Ile Leu Ser Phe Ala		
260	265	270
Arg Leu Ser Trp Cys Leu Gln Ser Ile Leu Phe Val Leu Pro Asn Gly		
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Gln Ala His Lys Pro Ser Gly Ala Arg Val Pro Ile Ser Leu Val Glu		
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Phe Thr Lys Gln Ile Ile Thr Gly Arg Asp Val His Pro Gly Leu Phe		
370	375	380
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Ala Asn Trp Phe Thr Gly Leu Asn Tyr Gln Ile Glu His His Leu		
385	390	395
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405	410	415
Glu Thr Leu Cys Lys Lys Tyr Asn Val Arg Tyr His Thr Thr Gly Met		
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450	455	

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His Cys Phe Glu Arg Ser Gly Leu Arg Gly Leu Cys His Val Ala Ile  
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Asp Leu Thr Trp Ala Ser Leu Leu Phe Leu Ala Ala Thr Gln Ile Asp  
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Lys Phe Glu Asn Pro Leu Ile Arg Tyr Leu Ala Trp Pro Val Tyr Trp  
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Ile Met Gln Gly Ile Val Cys Thr Gly Val Trp Val Leu Ala His Glu  
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Cys Gly His Gln Ser Phe Ser Thr Ser Lys Thr Leu Asn Asn Thr Val  
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Gly Trp Ile Leu His Ser Met Leu Leu Val Pro Tyr His Ser Trp Arg  
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Ile Ser His Ser Lys His His Lys Ala Thr Gly His Met Thr Lys Asp  
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Gln Val Phe Val Pro Lys Thr Arg Ser Gln Val Gly Leu Pro Pro Lys  
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Glu Asn Ala Ala Ala Val Gln Glu Glu Asp Met Ser Val His Leu  
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Asp Glu Glu Ala Pro Ile Val Thr Leu Phe Trp Met Val Ile Gln Phe  
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Leu Phe Gly Trp Pro Ala Tyr Leu Ile Met Asn Ala Ser Gly Gln Asp  
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Tyr Gly Arg Trp Thr Ser His Phe His Thr Tyr Ser Pro Ile Phe Glu  
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Pro Arg Asn Phe Phe Asp Ile Ile Ser Asp Leu Gly Val Leu Ala  
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Ala Leu Gly Ala Leu Ile Tyr Ala Ser Met Gln Leu Ser Leu Leu Thr  
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Val Thr Lys Tyr Tyr Ile Val Pro Tyr Leu Phe Val Asn Phe Trp Leu  
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Val Leu Ile Thr Phe Leu Gln His Thr Asp Pro Lys Leu Pro His Tyr  
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Arg Glu Gly Ala Trp Asn Phe Gln Arg Gly Ala Leu Cys Thr Val Asp  
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Arg Ser Phe Gly Lys Phe Leu Asp His Met Phe His Gly Ile Val His  
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Thr His Val Ala His His Leu Phe Ser Gln Met Pro Phe Tyr His Ala  
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